Fall 2016

Department of Natural Resource Management Newsletter

Department of Natural Resource Management
South Dakota State University

DEPARTMENT OF NATURAL RESOURCE MANAGEMENT
NEWS LETTER

College of Agriculture and Biological Sciences

SUMMER – FALL 2016 ISSUE

Welcome to the NRM seasonal newsletter!

Our department has had a busy summer and early fall with field-work far and wide, annual meeting attendance, and our teaching and mentoring.

We have also entered a float for the 1st time for the HOBO Day parade! Stay tuned to see what develops from our creative undergraduate student groups within NRM ☺. Please place on your calendar our HOBO Day coffee and sweets in the atrium of McFadden Biostress from 8-9 am on Saturday October 22nd. Then check us out in the parade! We also hope to see you at the football game!

SDSU is utilizing a new server for its web site so please be patient with our **new Departmental web site**: https://www.sdstate.edu/natural-resource-management

We welcome two new NRM field extension specialists, **Sean Kelly** and **Jimmy Doyle**! They are both based in Winner and will be working as a team with **Pete Bauman** based in Watertown to meet the needs of our constituency. We also have as part of the NRM team, **Kathy Reeves** based in Rapid City.

I would be remiss if I did not share that we are losing two valuable faculty members at the end of this semester. **Dr. Roger Gates** is restarting his career as an extension specialist in Georgia. We had the opportunity to thank Roger in person when he came east to attend the SDSU Conference in late September. **Dr. Niall Hanan** (GSCE) is departing to lead the LTER group at New Mexico State University.
We wish them both well but they will be greatly missed!

Roger Gates (left), Bill Gibbons (seated), background (left to right) NRM Department Head; Michele Dudash, Daniel Scholl, Jim Weiss and Dr. Muthiah Muruganandam

We love to hear from you so please stay in touch and keep us informed of your activities and if you plan to visit.

Best to all,

Michele

SAVE THE DATES:

Hobo Day morning coffee and sweets event on Saturday, Oct. 22, 2016 8-9am.

Oak Lake Research Retreat will be held on October 29th, 2016 at Oak Lake Field Station.

Holiday Party will be held on Tuesday, December 13th, 2016 at the Old Sanctuary from 6-10pm.

Scholarships and Awards Banquet will be held on Tuesday, April 18, 2017 on the SDSU campus.

If you plan to attend any of these events, please email us at: SDSU.nrm@sdstate.edu

NRM NEWS

American Fisheries Society – Kansas City

We had a great turn out at the 146th annual AFS meeting held in Kansas City, Missouri in late August. Fisheries faculty – Drs. M. Dudash (Head), M. Barnes (adjunct), K. Bertrand, M. Brown, S. Chipps, B. Graeb, and M. Wuellner – along with graduate and undergraduate students contributed 11 platform papers and 8 posters. Graduate students representing SDSU were T. Bruce, S. Fopma, S. Jones, T. Kasiga, N. Martorelli, D. Nelson, A. Rosberg, D. Schumann, A. Sundmark, T. Rehm, and M. Wagner (former Bertrand student). Undergraduate students attending were C. Evans, R. Driscoll, J. Haug, and C. Morehouse. Of note, there were a tremendous number of alums in attendance!

Drs. **Chipps** and Deslauriers (former Chipps' student) presented a continuing education workshop that provided training on their new bioenergetics software. David Schumann (Ph.D. student -- Bertrand) and Dr. Bertrand organized and moderated the *Managing Riverscapes: Conservation Tools to Assess and Improve Stream Fisheries* symposium.

Dr. Steve Chipps

Daniel Nelson (M.S. student – Wuellner) was a recipient of the *AFS Emerging Leaders Mentorship Award*. This program provides select individuals with the opportunity to participate in the leadership activities of the AFS Governing Board.

Ron Essig (left); US Fish and Wildlife Service and the President of the American Fisheries Society, 2015 -16 and Dan Nelson

Dr. Robert Neumann, a former fisheries Ph.D. student, received the *AFS Excellence in Public Outreach Award*, an award presented to an AFS member who goes the "extra mile" in sharing the value of fisheries science/research with the general public through the popular media and other communication channels. Dr. Neumann is the Managing Editor for In-Fishermen, a magazine produced by Prime Media.

Dr. Bertrand is current President of the Education Section. Dr. Wuellner is currently serving her second term on the Management Committee and is now past-president of the North Central Division.

Scientists monitor forests, grasslands in West Africa

By Christie Delfanian September 23, 2016, *Brookings Register*


Niall Hannan


Michael Wimberly

Two senior scientists at the Geospatial Sciences Center of Excellence will develop tools to help monitor and manage natural resources in West Africa using NASA satellite-based Earth imaging data.

Professor **Michael Wimberly** will utilize Landsat images to track the changes in forest reserves, while professor **Niall Hanan** will use Moderate Resolution Imaging Spectroradiometer, or MODIS, images to evaluate grazing lands. Both researchers are faculty in the Department of Natural Resource Management.


Livestock-owning communities, known as pastoralists, herd cattle, goats and sheep, following seasonal migration routes in northern Senegal.

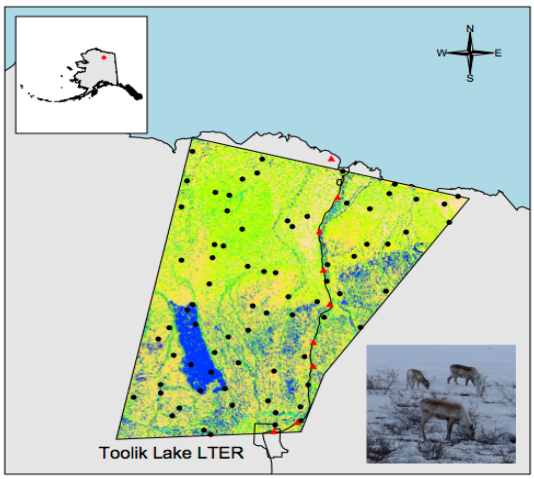
Their work is supported by SERVIR, a joint venture between NASA and the U.S. Agency for International Development to improve environmental decision-making in developing nations. Hanan and Wimberly are part of the applied science team for the newest center in Niamey, the capital city of Niger—SERVIR West Africa.
"SERVIR is designed to increase the uptake and utilization of NASA technology," Hanan explained. "In addition to serving as advisers, we also do our own research and bring our own specific ideas and products to the hub."
West Africa is composed of 18 countries covering an area two-thirds the size of the United States. Though the hub will serve the entire region, critical regional issues, such as food security, water resources and land use change, in Burkina Faso, Ghana, Niger and Senegal have been designated as the first priorities.

Examining forests in Ghana - Wimberly and professor Mark Cochrane, a wildfire expert, will examine forest reserves and fragments in southern Ghana through a three-year, $628,713 SERVIR grant. These researchers have built similar models to monitor forests in temperate regions and in the Amazon. One postdoctoral researcher will also work on the project. The forested regions of West Africa are among the most climatically marginal tropical forests, Wimberly noted. "They are barely wet enough to be tropical forests and pressure from land-use effects and dense human populations are very intense in this region." The forest reserves are a relic of colonialism, when the British set aside forested areas as a resource for timber production. "Because of their potential for wood production, they haven't been completely obliterated or converted into farmland," he said. However, fire, overharvesting and illegal logging have degraded some of these reserves. "We're taking advantage of the long-term archive of Landsat imagery and using newer techniques to tease out subtle changes," Wimberly said. Through this approach, the researchers will be able to identify intact forests as well as hotspots where degradation is occurring. That information will help government agencies decide how to manage these areas.

Assessing vegetation in grasslands - "The idea is to be able to predict, anticipate and plan," said Hanan, who will use 15 to 20 years of MODIS data to map woody resources—trees and shrubs—and forage on the West African savannas through a three-year, $580,000 grant. One postdoctoral researcher will work on the project. These grasslands are home to livestock-owning communities, known as pastoralists, who herd cattle, goats and sheep, following seasonal migration routes. Their animals are an important source of protein not only for their own communities, but for agricultural communities across the region. Hanan has worked in Senegal, Niger and Mali for more than 30 years. In a recent National Science Foundation project, he used satellite imagery to show how a semiarid region with grasslands and scattered trees known as the Sahel has recovered from droughts in the 1970s and 80s. A nongovernmental organization working in Mali could get information from the hub on the long-term changes in woody resources in their region and use that information to develop sustainable wood harvest and alternative energy strategies, Hanan explained. At the end of the training and capacity-building project, Wimberly said, "we will transfer the methods and knowledge to partner organizations in Ghana and other West African countries." Hanan said, "The intent is that national and regional governments and nongovernmental agencies will use this data to impact the livelihoods and welfare of communities across the area."

Nutritional Landscapes of Caribou in Northern Alaska

Assistant Professor, A. Joshua



A hypothetical 'nutritional landscape', a model of quantity and quality of forage in northern Alaska. Insets depict the location of the study area in Northern Alaska, and caribou foraging in late winter.

Assistant Professor A. **Joshua Leffler's** Lab, as part of a consortium of laboratories at five universities around the US, has received a National Science Foundation grant to study the future of caribou forage in northern Alaska. As the only abundant, large herbivore in the far north, caribou are a critical component of Arctic ecosystems and an important cultural and food resource for local residents, most of whom are Native Alaskans. Climate change is effecting Arctic systems more profoundly than other locations around the world, and temperatures are expected to warm dramatically in the next 50-100 years with associated changes in precipitation. We will use a combination of experimental data, distributed vegetation sampling, tissue chemical analyses, remote sensing, and snow-cover modeling to build 'nutritional landscapes' for caribou now, and in the future for a study area on the North Slope of Alaska. This NSF Arctic System Science grant will support two NRM graduate students and several undergraduates for the next three years.

News from the South Dakota Cooperative Fish & Wildlife Research Unit

The Coop Unit would like to extend our thanks to alumni, cooperators, students and staff for another productive year at SDSU. Unit scientists are fortunate to work with a talented group of graduate students, Postdocs, and agency biologists to address wildlife research needs in our state and region. Since 1963, over 250 students have received graduate degrees working with Unit scientists at the SD Coop Unit. Our many Cooperators provide critical support to the Unit program and in return, they benefit from the technical training associated with graduate education at SDSU. Job placement and professional accomplishment are testaments to the success of Coop Unit students and Postdocs who have moved on to careers with Federal, State, and Non-government (NGO) partners – as well as academic institutions in the U.S. and Canada. A few recent examples:

Laura Heironimus with a white sturgeon on the San Joaquin River, CA

FEDERAL AGENCIES: Dr. Daniel James (Ph.D 2011), Fisheries Biologist with the U.S. Fish & Wildlife Service (USFWS) and Adjunct Faculty member in NRM was appointed to serve on the *Effects Analysis Science Team* for Pallid Sturgeon recovery in the upper Missouri River basin. Laura Heironimus (M.S. 2015) and Kjetil Henderson (M.S. 2014) recently accepted positions as Fisheries Biologists with the USFWS in Arcata, CA and Carterville, IL, respectively. And Dr. Cari- Ann Hayer(Research Associate, 2012) recently accepted a new position with the USFWS in Green Bay, WI. Dr. Hayer previously served as a Research Fisheries Biologist with the USGS Columbia Environmental Research Center in Columbia, MO.

Natalie Scheibel (right) collecting steelhead from the Methow River, WA

STATE AGENCIES: **Dr. Katie Bertrand** (Postdoc 2007), Associate Professor with NRM, and Dr. Mark Fincel (Ph.D. 2011), Senior Biologist with SD Game, Fish and Parks (SDGFP), currently serve as President and President-elect, respectively, for the Education Section of the American Fisheries Society (AFS). Hilary Meyer (M.S. 2011), Fisheries Biologist with SDGFP's Missouri River Fisheries Center, serves as co-Editor of the Education Section Newsletter for AFS; and Mike Greiner (M.S. 2013) recently returned to South Dakota where he works as a Fisheries Biologist for SDGFP on the Missouri River. Megan Thul (M.S. 2014) – joined the Iowa Department of Natural Resources' *Interior Rivers and Streams Investigations Team* where she works as a Fisheries Biologist at the

Manchester Research Station. And Natalie Scheibel (M.S. 2015) recently accepted a position as Assistant District Fish Biologist for the Oregon Department of Fish and Wildlife working with anadromous salmon in Newport, OR. Jeremy Kientz (M.S. 2016) is a Research Biologist with SDGFP's McNenny Hatchery in Spearfish, SD where he works with trout ecology & management in the Black Hills. Jeremy was a recipient of the *Janice Lee Fenske Memorial Award* at the 2016 Midwest Fish & Wildlife Conference in Grand Rapids, MI.

NGO PARTNERS: Ryann Cressey (M.S. 2016) was hired by Ducks Unlimited, Inc. in 2015. Ryann works at the Great Plains Regional Office in Bismarck, North Dakota and is a full time, permanent Wetland Biologist.

Dr. David Deslauriers (left)

UNIVERSITIES: Dr. David Deslauriers (Ph.D. 2015) is a Post-doctoral Research Fellow working with Lake Sturgeon at the University of Manitoba. David was recently honored as a *2016 Outstanding Young Professional* by the Education Section of the American Fisheries Society and serves on the Foundation Committee for the North American Sturgeon and Paddlefish Society. Dr. Adam Janke (Ph.D. 2016) recently started his new job as Assistant Professor at the University of Iowa, Ames, IA. Adam received numerous awards as a Coop Unit student including the *Edward D. & Sally M. Futch Graduate Fellowship* from Ducks Unlimited.

Improving Bald Eagle Monitoring in Southern Alaska

Bald eagle (*Haliaeetus leucocephalus*) populations are susceptible to environmental contaminants and other stressors. Consequently, bald eagles are a "vital sign" monitored by the Southwest Alaska and Central Alaska

Inventory and Monitoring Networks in cooperation with Katmai National Park and Preserve, Kenai Fjords National Park, Lake Clark National Park and Preserve, and Wrangell St. Elias National Park and Preserve. Biologists in the parks have inconsistent monitoring objectives, and differing perceptions of monitoring variables that make it difficult to integrate sampling designs under a regional protocol. New research in Natural Resource Management, in conjunction with **Dr. Larry Gigliotti** of the USGS Cooperative Fish and Wildlife Unit and **Dr. Tammy Wilson** of the National Park Service will integrate opposing views into a new monitoring framework. The sustainability of the bald eagle monitoring program will be enhanced by conducting a formal process involving scientists and resource managers at the National Parks in Alaska that elucidates common objectives and fosters consensus and buy-in. They will develop a structured decision process that uses surveys to identify core values, sets objectives, identifies reasonable sampling scenarios, and choose a sampling regime that optimizes objectives while minimizing cost. The project will fund one MS student at SDSU.

Pheasant ecology in agricultural landscapes: optimizing agriculture and pheasant production

By Sprih Harsh October 11, 2016

A study on pheasant ecology in landscape with disparate habitat has been initiated which will greatly increase our understanding of how landscape composition and configuration influence pheasant vital rates and how differences in these vital rates influences populations. Given high demand for pheasants and the limited budget for conservation implementation, it is becoming highly important to maximize pheasant production on the remaining habitat. Results of this study will help managers identify ideal habitat configurations for pheasant production (i.e., nest survival, brood production, overwinter survival).

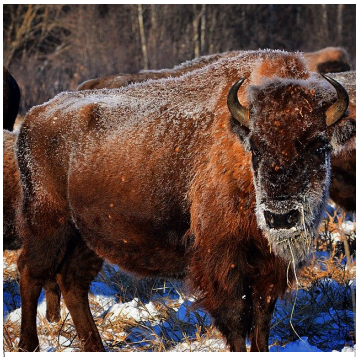
The study will be conducted for 3 years at two different study sites in Beadle County and will involve estimating adult survival, nest survival and chick survival in different habitats. The final results of study will allow landowners, managers to optimally develop pheasant habitat along with maintaining agricultural activities, optimizing both economic returns and pheasant population.

Funding Agencies: South Dakota Game Fish and Park, Pheasant Forever, Department of Natural Resource Management, South Dakota State University

Unveiling Bison Summer Diet Selection at Northern Fringe of Historical Distribution

By Joshua L. Leonard

Bison (*Bison bison*) were historically distributed throughout North America with the northern edge of the distribution occurring in North-central Manitoba and surrounding provinces. Despite occupying the boreal zone of North America, little is known of bison forage selection patterns when occupying a densely forested aspen (*Populus* spp.) ecosystem. Historically, bison have been classified as grass-roughage feeders (Hofmann 1989); primarily consuming graminoids (grasses, sedges and rushes) and we were interested to determine if this was similar for bison inhabiting North-central Manitoba.



Adult female bison on a cold, autumn morning in Manitoba, Canada. *Photo by J. L. Leonard.*

During June-August 2015, we initiated a study on Olson's Conservation Bison Ranches, Pine River Ranch, Pine River, Manitoba, Canada, to examine forage selection patterns for bison. We thought that vegetative composition of bison diets would be consistent with availability, diets would shift along with forage availability, and bison diets would predominately consist of grass and sedge species.

We opportunistically collected adult female fecal samples and identified forage composition using the DNA barcoding method; which typically identifies plant fragments within feces to the genus or species level. We estimated percent cover of grasses, forbs, browse, sedges, and rushes from 0-100%, in 5% increments, to determine the amount of forage available to bison. We then compared bison use (% plant composition of diets) to availability (% plant cover on the ground) to determine if bison were actively seeking out forages or randomly consuming forages as they were encountered.

Overall, bison diets were comprised of 44% grass, 38% forb, 16% browse, and < 2% sedge and rush. Forage availability was comprised of 51% grass, 28% forb, 2% browse, 11% sedge, and 8% rush. All statistical analyses indicated that bison use and availability differed ($P \leq 0.05$) for each forage group throughout the summer, as predicted. However, bison diets and availability of grasses and forbs were inversely related as the summer

progressed. Grasses became more available throughout summer, whereas grass composition in bison diets decreased over summer, while forbs were opposite of that.

Additionally, grasses and forbs were important dietary components for bison because combined, they comprised > 80% of bison diets. Bison actively selected grass during June, but avoided grass during July and August, whereas bison selected forbs during July and August, but avoided them in June. We predicted sedges would be an important food item during the summer, but they appeared to be unimportant, which we did not expect given bison's classification. Although sedge may not be an important summer food item, research has shown that bison in similar habitats almost exclusively forage on sedge during the winter (Larter and Gates 1991).

Browse comprised 16.3% of all bison summer diets, which is unusually high considering bison do not typically utilize woody vegetation, unlike cattle (Plumb and Dodd 1993). Moreover, our browse selection indices (≥ 6.00) were extraordinarily high in comparison to previously reported indices of 0.25 and 0.10 (Plumb and Dodd, 1993). These high indices may be a result from a lack of sampling forest vegetation, since forests in our study were not sampled as research has shown that bison spend 80% of their time in or within 25 m of meadows (Fortin et al. 2003). Nevertheless, our results suggest that future sampling of forest vegetation may be advantageous to determine if browse is an essential forage class for bison or if it is being incidentally consumed.

Our results indicated that bison consumed more browse and other low cellulose (forbs), high cell soluble forages to meet their dietary needs. Thus, suggesting that domestication of bison may have resulted in foraging behaviors more similar to elk and other intermediate feeders than that of cattle or sheep, especially at the northern edge of the historical distribution of the species.

Fortin, D., J. M. Fryxell, O. B. Lloyd, and F. Dan. 2003. Foraging Ecology of Bison at the Landscape and Plant Community Levels: The Applicability of Energy Maximization Principles. Oecologia 134, 219-227.

Hofmann, R. R., 1989. Evolutionary steps of ecophysiological adaptation and diversification of ruminants: a comparative view of their digestive system. Oecologia 78, 443–457.

Larter, N. C., and C. C. Gates. 1991. Diet and habitat selection of wood bison in relation to seasonal changes in forage quantity and quality. Canadian Journal of Zoology 69, 2677-2685.

Plumb, G. E., and J. L. Dodd. 1993. Foraging Ecology of Bison and Cattle on a Mixed Prairie: Implications for Natural Area Management. Ecological Applications 3, 631-643.

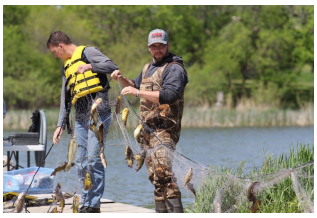
SDSU RANGE CLUB

On Saturday September 24, 2016, the SDSU Range club participated in an annual fund raiser event at the Forty Bar Ranch owned by Warren Hammerbeck located south of Chamberlain, SD along the Missouri River. Every year the Range Club helps collect vegetation data to monitor the unique high density-low frequency grazing system that Warren uses on is 4500 acre ranch to help manage healthy wildlife populations while meeting is cattle production goals. The students get a chance to put their classroom knowledge into action. Mr. Hammerbeck gets information regarding his grazing plan and makes a donation to the club. The Club uses these types of fund raising events to offset travel expenses to attend the annual Society for Range Management meetings.

Pictured are Alex Mergen(Rapid City, SD) and Ella Woroniecki

Natural Resource Management Techniques (NRM 230)

We launched a new field techniques course during the interim period following the spring 2016 semester. This was a week-long course taught at the Oak Lake Field Station. Previously, this course had been taught as an on-campus lecture course, but our goal was to provide freshman-level students with a more experiential introduction to techniques, common measurements, and data collection for the management of natural resources.



Specific learning outcomes include: 1) understanding gear types and appropriate uses of common sampling techniques for various organisms, including aquatic invertebrates, fish, mammals, birds, and plants; 2) understanding basic approaches to water quality and riparian habitat sampling and assessment; 3) equipment safety; 4) developing basic skills in common wildlife monitoring techniques; 5) developing basic skills in the use of topographic maps and orienteering; 6) basic data analysis and interpretation; and 7) improving critical thinking and teamwork skills.

Students (N=65) were split into teams and rotated among 15 activity stations during the week. Feedback from students indicated they thoroughly enjoyed the hands-on approach and instructors noted much more interaction with the students than observed previously in the formal classroom setting. Half of the students stayed on-site at the field station throughout the week, allowing them to use their free time for recreational and social activities. Our tentative plans are to expand the course duration to allow more time for activities and move the course to mid-summer to avoid weather issues.

Natural Resource Camp

The Department of Natural Resource Management held its 2nd Natural Resource Camp last July. The camp is intended for high school students, entering grades 9, 10, 11, and 12, who have a strong desire to learn more about the natural world or who have an interest in pursuing a career related to natural resources. Nineteen high school students from South Dakota, Minnesota, and Nebraska attended this year's camp. Activities included bird capture, fish sampling, aquatic invertebrates, prairie plant diversity, bat surveys, stream and lake ecology, amphibian and reptile capture and identification, knot tying, soil health, stars and planets, and radio telemetry.

The camp was led by NRM instructor, Leslie Vincent. Two NRM undergraduates, Jenna Hayungs and Nic McGlothlen, assisted with the camp and served as camp counselors. The camp activities were led by SDSU faculty and graduate students, as well as professionals from Natural Resource Conservation Service and Day County Conservation District. Faculty activity leaders included Dr. KC Jensen, Dr. Scott Pedersen, Dr. Sandy Smart, and Dr. Melissa Wuellner. Graduate student activity leaders included Dan Nelson, Brandon Vanderbush, Elise Hughes Berheim, and Bailey Gullikson. Other activity leaders included Stan Bolz, Dennis Skadsen, Cory Zirbel, and Jennifer Krauel.

Opportunities to support the NRM Department:

1) Student Education Enhancements, Scholarships, and Endowments:

Your impact: Expanding undergraduate scholarship dollars available to support students enrolled in Ecology and Environmental Science, Natural Resource Law Enforcement, Rangeland Ecology and Management and Wildlife and Fisheries Sciences. Expanding competitive graduate student research awards.

- The Natural Resource Management Department. Funds that enable strategic initiatives in academic and research programs through implementation of the department strategic plan.

- Clifford H. Fiscus Endowment that helps supports our NRM Departmental seminar series. Clifford H. Fiscus (B.S. 1950) was a long-time friend of the department. In 2004, he provided an endowment to the department that is used to bring guest speakers to campus. This is an important aspect of our graduate student training and pursuit of scholarly excellence.

- NRM Education Fund. This fund enables talented undergraduate students to present their research at local and national meetings.

- Program Targeted Scholarships. Gifts of less than $1000 can be targeted toward undergraduate scholarships funds in (1) Ecology and Environmental Science, (2) Natural Resource Law Enforcement, (3) Rangeland Ecology and Management, (4) Wildlife and Fisheries Sciences.

  -If you are interested in donating at the $1000 level or above, we can work with you to develop a named scholarship. A list of our current named scholarships can be found at: https://www.sdstate.edu/nrm/academics/scholarships/upload/Undergrad-Scholarships.pdf-

- Dave Willis Fisheries Research Award Endowment
  This Endowment was established to honor Dr. Willis' life work and to sustain his legacy through promoting excellence in fisheries education and research. We encourage and appreciate your support of Dave's legacy through a donation to support the growth of this **endowment.** Gift pledges can be made over multiple years or as single donations. Proceeds will be used to provide competitive research awards to graduate and undergraduate fisheries students who have demonstrated scholarly excellence in fisheries science and best personify Dave's exceptional career and service to our nation's natural resources.

- Kenneth F. Higgins Waterfowl Legacy Research Endowment
  This Endowment honors the life and the distinguished career of Dr. Ken Higgins, a former wildlife research biologist with the U.S. Department of the Interior and the South Dakota Cooperative Fish and Wildlife Research Unit, and a professor emeritus in the Department of Wildlife and Fisheries Sciences at South Dakota State University.

- Clifford H. Fiscus Waterfowl Research Endowment
  The Fiscus Waterfowl Research Endowment fund honors the life of of Mr. Fiscus, who earned a degree in Wildlife Management at South Dakota State College. This endowment provides support for waterfowl research activities which may enhance future management or welfare of waterfowl or other wetland dependent avian species and/or their habitats.

- Pheasants Forever Upland Game Bird Research Endowment
  This Endowment honors the efforts of the Brookings County Pheasant Restoration Association and the Brookings County chapter of Pheasants Forever. An initial donation of $25,000 established the principal for this endowment.

- Kevin Honness Memorial Scholarship Announcement
  The Honness Scholarship is awarded each year (31 March) to student members of the Great Plains Natural Science Society. Two awards ($500 each) are currently available, **one for graduate** and one for **undergraduate** researchers; preference will be given to students conducting research in the Great Plains. Applications will be accepted each year from 1 November until 28 February. Interested students can find additional details and application form at http://www.sdstate.edu/nrm/organizations/gpnss/kevin-honness-memorial-scholarship.cfm.

- Curtis M. Twedt Upland Game Research Endowment
  Curtis M. Twedt, a native of Volga, SD, graduated in Wildlife and Fisheries Sciences in 1959. Dr. Twedt enjoyed a 31-year career with the Nebraska Game and Parks Commission as an upland game and research biologist. The recipient of the Twedt research grant shall be selected by the Department of Natural Resource Management at SDSU. The long-term vision of the Department is to eventually be able to provide a graduate research assistantship from this endowment.

- Jesse W. West Research Endowment
  This Endowment is intimately tied to the Pond Boss magazine and forum. It honors the life of Jesse W. West, a Mississippian and professor of geology. While teaching geology "summer camp" in the west, including Colorado, California, and the Black Hills (one of his favorite geologic places), he developed a love of the area and its people, which he shared with his family. His strong belief in helping others along their journey in applied science is the cornerstone of Jesse's endowment.

2) Off Campus Research Facilities - Oak Lake Field Station or Wildlife and Fisheries Research Unit (existing resources to which you could contribute are identified below).

Your impact: Expanding endowed undergraduate research opportunities grants for our Oak Lake Field Station and Wildlife and Fisheries Research Unit; Funding to support construction of off-campus teaching and research facilities and/or purchase large research equipment.

- Charles and Marcia McMullen Undergraduate Research Award.
  An *Endowment* recently established in honor of Dr. Charles and Marcia McMullen who have been long-time supporters of the Oak Lake Field Station. Chuck served as the first director of the Oak Lake Field Station and was instrumental in working with President Robert Wagner to establish the field station as a resource to students interested in the natural sciences. This endowment provides support for NRM undergraduate students interested in conducting undergraduate research at the station.

- Oak Lake John Haertel Memorial Research Award
  An *Endowment* established in honor of Dr. Jon Haertel, vertebrate biologist in Biology & Microbiology. Jon's love of vertebrate animals and long-time contributions to the study of vertebrates resulted in establishment of this endowment to support undergraduate research on vertebrates at the Oak Lake Field Station.

- Rogen-Trooien Oak Lake Endowment
  An *Endowment* established in honor of Alvera Rogen and the Trooien Family who had a long-time family connection and interest in the Oak Lake Field Station. This fund was established to support long-term maintenance and development of facilities at the Oak Lake Field Station toward the education and development of students interested in South Dakota natural resources.

- Oak Lake Field Station Fund

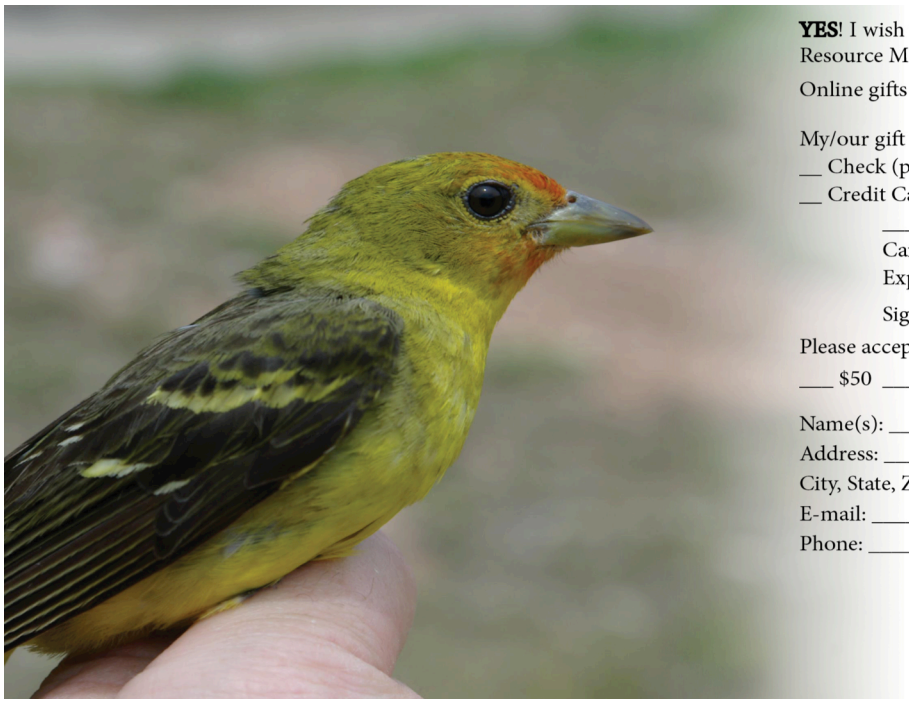
  A flexible field station account developed using unrestricted gifts to the Oak Lake Field Station and utilized for newsletters, web site, hospitality expenses and meeting attendance in relation to field station operations and programs.

3) Endowed research faculty positions in Ecology or Environmental Science, Range Ecology or Range Management, Wildlife Biology and Fisheries Biology.

Your impact: Faculty endowments provide funding for perpetuity that will allow the Department to recruit exceptional faculty members and provide them with the resources that are essential to their ability to do their critical work.

(*Targeted gifts would also be appreciated to support the purchase of research equipment and enhancement of research lab facilities in each of the areas identified above*.)

Please return this form or contact our Foundation partners, Mike Barber (605.321.6468) to learn more about how you can make a difference in the Department of NRM.



YES! I wish to contribute to the SDSU Department of Natural Resource Management.

Online gifts can be made through: www.sdstatefoundation.org

My/our gift will be paid in the following manner:
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CONTACT US with news, comments or questions:

PLEASE contact us with Alumni Updates. We get more positive feedback from people who appreciate these updates than anything else in the newsletter!

*Also, **please** send email address updates, corrections, and share the newsletter with friends and alumni so we can grow that email address list. **Thanks** for any help!*

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